Onzen
Technical Guide

Onzen + Sea Salt
= Natural Salt Water care made easy.

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1.0 Onzen Technical Guide

1.1 Obtaining Technical Data For Your Spa

To ensure you have the current appropriate technical data for your spa it is recommended that you obtain such data from your authorised retailer or from the Arctic Spas Web Site http://www.arcticspas.com.

1.2 Revision Summary

This publication has been fully revised to provide the supporting details Onzen Version 8, and spas with the Eco-Pak spa controller.

1.3 What is Onzen?

Onzen is an all-natural, salt-water softening and maintenance system.

1.4 What Does Onzen Do?

· Softens water.
· Clarifies water.
· Adds back up sanitizing (Chlorine) agents, automatically.

1.5 What Are The Benefits of Onzen?

· Makes skin feel soft and smooth.
· Makes water look sparkling clean.
· Reduces contact with harsh chemicals.
· Dramatically reduces time and money needed to maintain spa water.
· Reduces impact to the environment:
    1. Fewer trips to the spa store for supplies.
    2. Less packaging wasted on chemical containers.
    3. Less industrial waste produced making spa chemicals.

1.6 How Does Onzen Work?

· Natural mineral sea salt blend is added to water when spa is filled.
· Sanitizing agents (Chlorine) are produced and mixed with water, automatically.
· Output is easily controlled to suit very low to very high use.

1.7 How to Determine Spa Production Date

The Spa production date can be determined from the Spa Serial Number recorded on the Spa Identification Plate mounted on the cabinet usually under the topside controller.

Example

Spa Serial No. **A10H131112**

· The two digits following the first letter represent the year that the Spa was built 10 = 2010.
· The letter following the first two digits represent the month that the Spa was built H = August.

1.8 Definitions of Terms

TERM	DEFINITION
Onzen	An all-natural, salt-water softening and maintenance system.
Onzen Output Electrode	Platinum-iridium Titanium electrode - equipped salt cell converts the saltwater solution to sanitizer, and as this solution reverts back to its natural form (salt) after sanitizing. Unless large volumes of water are added to the spa you never have to add more salt.
Onzen Output Electrode Version	Modification status of the electrode fitted to the spa.
Calcium Hardness (CH)	Calcium Hardness is a measure of the total amount of dissolved calcium salts in the water. CH helps determine how scaling or corrosive the water is. It is believed that calcium helps control the corrosive nature of water. Calcium has two major problems in Hot Water Chemistry: 1. CH has a tendency to precipitate (fall out of suspension in high temperatures. 2. High pH will cause calcium to precipitate. The problem with calcium falling out of suspension is that it collects on the heater and pump, and shortens their life. Any natural corrosiveness in the water can be combated by maintaining a slightly higher Total Alkalinity Level.
Alkalinity Total Alkalinity (TA)	A measure of how stable the pH is (a measure of the total levels of carbonates, bicarbonates, hydroxides, and other alkaline substances in the water). TA is referred to as the water's ""pH buffer"". In other words, it's a measure of the ability of the water to resist changes in pH level. **If the TA is too low**, the pH level will fluctuate widely from high to low. Fluctuations in pH can cause corrosion or scaling of the spa components. **Low TA** can be corrected by adding Arctic Pure, Perfect Balance to the spa water. **If the Total Alkalinity is too high**, the water will be more susceptible to scale and high pH. High pH may be difficult to bring down. Note: Salt systems naturally drive pH levels to increase. **High TA** can be lowered by adding Arctic Pure, Adjust Down to the spa water. Once the TA is Balanced, it normally remains stable, although some sanitizers, and the addition of more water with a high or low alkalinity will raise or lower the TA reading of the water.

TERM	DEFINITION
Potential Hydrogen (pH)	The pH level is the measure of alkalinity. Maintaining a Balanced pH level is extremely important for: · Optimizing the effectiveness of the sanitizer. · Maintaining water that is comfortable for the user. · Preventing equipment deterioration. · **Note: Salt systems naturally drive pH levels to increase, strive to achieve a Balanced pH level.** **If the spa water's pH level is too low, the following may result:** · The sanitizer will dissipate rapidly. · The water may become irritation to spa users. · The spa's equipment may corrode. **Low pH** can be raised by adding Arctic Pure, Adjust Up to the spa water. **If the pH level is too high, the following may result:** · The sanitizer is less effective. · Scale will form on the spa shell surface and the equipment. · High pH will cause calcium to precipitate (fall out of suspension). · The water may become cloudy. **High pH** can be lowered by adding Arctic Pure, Adjust Down to the spa water. It is important to check the pH on a regular basis. The pH will be affected by the bather load, the addition of new water, the addition of various chemicals, and the type of sanitizer used.
Chlorine Free Chlorine (FCL)	FCL is the active form of chlorine that actually kills bacteria and algae (It is a Sanitizer). Sanitizer is extremely important for killing algae, bacteria and viruses, and preventing unwanted organisms for growing in the spa. At the same time, you don't want too high a sanitizer level, or it can irritate your skin, lungs and eyes. Always maintain the sanitizer level in your spa at the recommended level for each type of sanitizer.
Chlorine Residual	The actual level of chlorine in the water after the chlorine demand has been satisfied.
Sanitizer	Chemical used to kill bacteria. Generic names: Chlorine, Bromine. **Arctic Pure, Boost or Refresh.**

TERM	DEFINITION
Parts Per Million (ppm)	ppm: parts per million, a standard measure of chemical or mineral concentration.
Organic waste	Debris such as microorganisms, perspiration, urine, etc. which needs to be burned up or "oxidized" regularly to prevent haze, algae, chloramines, etc.
Shock	An oxidizer that "burns off" the organic wastes which cause cloudiness and algae. It is a generic term for a chemical used to oxidize organic wastes. Arctic Pure, REFRESH.
ORP	Oxidation–Reduction Potential. This is simply a measurement of the water's ability to cleanse itself. ORP is measured in millivolts (mV).

1.9 Water Chemistry Abbreviations/Acronyms & Levels

ABBREVIATION/ACRONYMS	DEFINITION CORRECT	CHEMICAL LEVELS
CH	Calcium Hardness	50 - 150 ppm
TA	Total Alkalinity	80-100 ppm
pH	Potential Hydrogen	7.2 – 7.6 ppm
FCL	Free Chlorine	1 – 3 ppm
ORP	Oxidation–Reduction Potential	600 - 1000

1.10 Settings Abbreviations Acronyms

ABBREVIATION/ ACRONYMS	DEFINITION
Fd	Filter Cycle Duration Fd 00 = no filtration. Fd 01 = 1 hour/cycle. Fd 02 = 2 hour/cycle.
FF	Filter Cycle Frequency FF 1 = 1 cycle in 24 hours. FF 2 = 2 cycles in 24 hours. FF 3 = 3 cycles in 24 hours. FF 4 = 4 cycles in 24 hours.
On	Onzen Cycle Duration 0-24 Hours per day * Cycles are divided into 4 ie: If 8 hours is selected, the system will perform 4 x 2 hour cycles per day.
O3	Ozone Cycle Duration 0-24 hours per day * Peak II only, if Peak 1 is installed ozone will run during filtration.

1.11 Onzen Warranty

2013 Factory installed Onzen systems serial #150000 and greater will have a two-year warranty on labor and components. Excluding the electrode that will have a 30-day warranty against defects in workmanship. The electrode as a consumable part that needs to periodically changed like a filter. Retrofit Onzen systems will have the same warranty minus labor.

We will continue to support old versions of onzen as we have in the past. Spas with serial #149999 and lower will have a two-year warranty on labor and components. The electrode will have a 1-year warranty. Retrofit Onzen systems will have the same warranty minus labor. We may require an email address for the consumer in order to process claims so we can send them clear definition of how to use their system and clearly tell them that the electrodes are consumable items like filters or chlorine etc).

The recommended salt concentration is 1500-1800 ppm. Even though the lifespan on the electrode seems to be maximized at 2200-2400 ppm when we consider the overall impact of the corrosive nature of salt on the other spa components it is clear that lower salt is better.

There will be no warranty on listed parts: heaters, heater barrels, jets, grab rails, pump seals, and pump motors affected by leaking pump seals. subject to salt-water failure with any system where the consumer is not using ArcticPure brand salt.

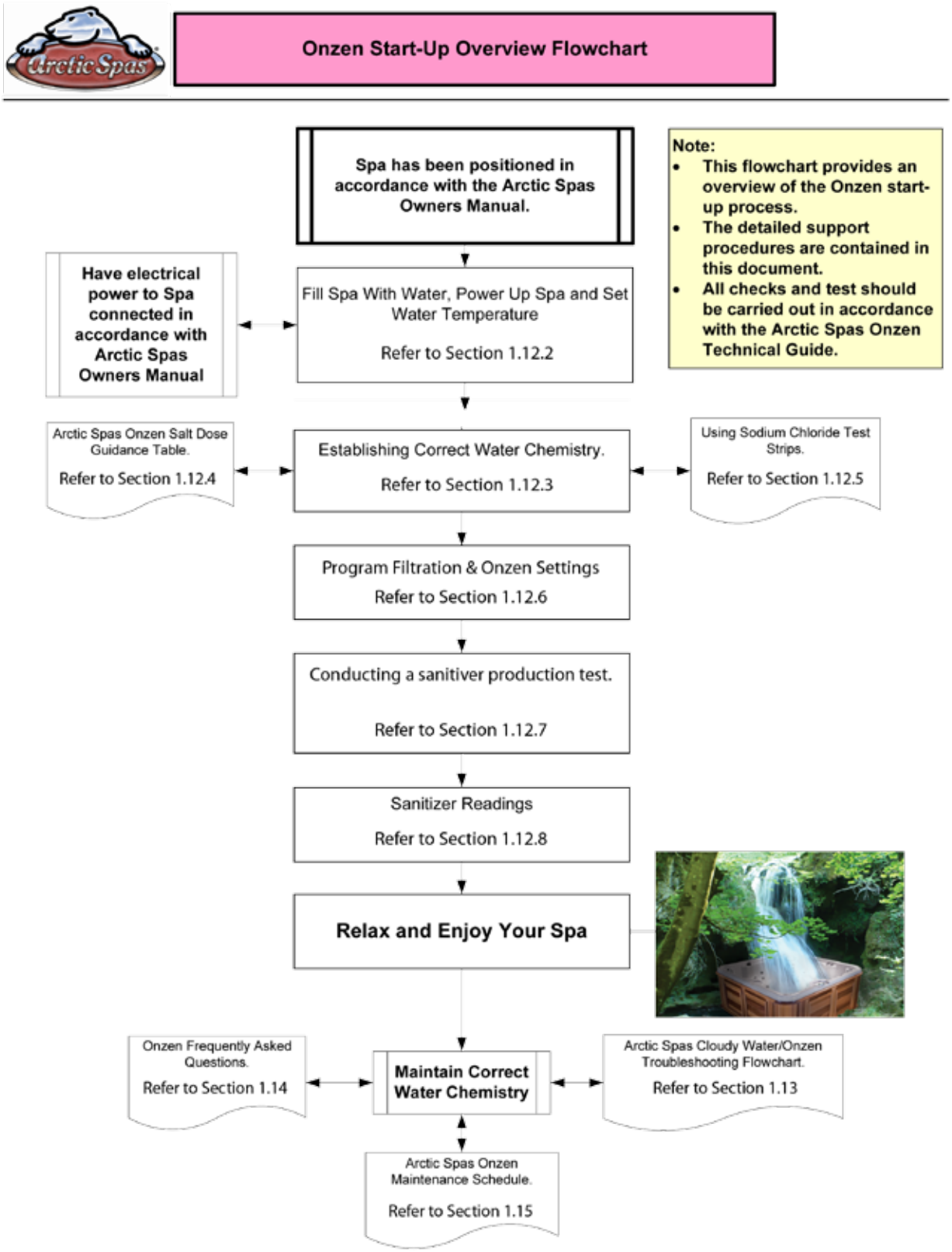
Spa water quality and other damages resulting from water imbalance are specifically not covered by this warranty. Warranty work must be completed by authorized Arctic Spas retailers only. No labour warranty is provided by Arctic Spas for Onzen systems installed on site, only faulty parts are covered.

Disclaimer: this is not an automatic water care system. The system is set up for typical hot tub use. “Boost” may be needed to supplement sanitizer generation with higher hot tub use.

The spa user is ultimately responsible for maintaining proper sanitary water conditions. Use of salt other than Arctic Pure sea salt blend will damage the components and void the warranty. The Arctic Pure blend has been developed to protect Onzen components from damage and the use of alternative salt blends will be easily detected by technicians.

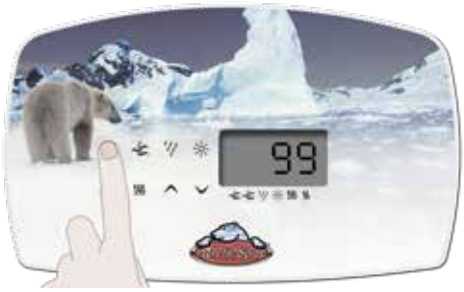
1.12 Onzen Start – Up Guide

1.12.1 Onzen Start-Up Overview Flowchart


Onzen Start-Up Overview Flowchart
Spa has been positioned in accordance with the Arctic Spas Owners Manual.
Note:
This flowchart provides an overview of the Onzen start-up process.
The detailed support procedures are contained in this document.
All checks and test should be carried out in accordance with the Arctic Spas Onzen Technical Guide.
Have electrical power to Spa connected in accordance with Arctic Spas Owners Manual
Fill Spa With Water, Power Up Spa and Set Water Temperature
Refer to Section 1.12.2
Arctic Spas Onzen Salt Dose Guidance Table.
Refer to Section 1.12.4
Establishing Correct Water Chemistry.
Refer to Section 1.12.3
Using Sodium Chloride Test Strips.
Refer to Section 1.12.5
Program Filtration & Onzen Settings
Refer to Section 1.12.6
Conducting a sanitiver production test.
Refer to Section 1.12.7
Sanitizer Readings
Refer to Section 1.12.8
Relax and Enjoy Your Spa
Onzen Frequently Asked Questions.
Refer to Section 1.14
Maintain Correct Water Chemistry
Arctic Spas Cloudy Water/Onzen Troubleshooting Flowchart.
Refer to Section 1.13
Arctic Spas Onzen Maintenance Schedule.
Refer to Section 1.15

1.12.2 Fill Spa With Water, Power Up Spa and Set Water Temperature

The following steps provide guidance to help establish correct chemically balanced water. To help ensure chemicals dissolve appropriately it is good practice to first mix/dissolve the chemical in an uncontaminated container of hot water before carefully adding to the spa water.

Steps to Fill Spa With Water Power Up Spa and Set Water Temperature	
	Step 1. Fill Spa Fill your spa through the filter intake as shown to the appropriate level (just under the head rests). If you have sediment or high mineral content a "carbon filled pre-filter", as pictured, can help. (This is optional and will prolong the fill time).
	Step 2. Connect/Turn on Electrical Power to the spa once the spa is filled to the proper level, and turn the power on to the spa on.
	Step 3. Set Water Temperature Set the water temperature control on the Topside Controller to the desired temperature (between 100ºF and 104ºF or 38°C and 40°C).

1.12.3 Establishing Correct Water Chemistry

The following steps provide guidance to help establish correct chemically balanced water.

To help ensure chemicals dissolve appropriately it is good practice to first mix/dissolve the chemical in an uncontaminated container of hot water before carefully adding to the spa water.

Steps to Establish Chemically Balanced Water With Onzen	
	Step 1. Test and Adjust Calcium / Total Alkalinity (a) Test Calcium hardness. Level should be between 50-150 ppm. If high, lower with a stain & scale controller such as Arctic Pure, Best Defence, to help hold the Calcium in suspension. **NOTE: Salt systems perform best with Low Calcium levels.** (b) Test Total Alkalinity. It should be 80 – 100 ppm (100 max). If high, lower Total Alkalinity with Arctic Pure, Adjust Down (pH Down) or muriatic acid. Do not raise Total Alkalinity! **WARNING: Skipping these steps on Start-up can cause scaling problems and cloudy water that may not be covered under warranty.** **NOTE: Use all products according to directions on the bottle.**
	Step 2. Test and Adjust pH Test pH. Levels should be between 7.2 – 7.6. If pH is high, (over 7.6) add Arctic Pure, Adjust Down. If pH is low, (under 7.2) add Arctic Pure, Adjust Up. **NOTE: Use all products according to directions on the bottle.** **NOTE: Salt systems naturally drive pH levels to increase, strive to achieve a Balanced pH level.** **NOTE: High pH will cause calcium to precipitate (fall out of suspension). The problem with calcium falling out of suspension is that it collects on the heater and pump, and shortens their life.**
	Step 3. Mix Salt Crystals Dissolve 1/3 of the **minimum** recommended salt dosage in a 5 Gallon (20 litre) pail of hot water. **Refer Arctic Spas – Onzen Salt Dosage Chart contained in this guide.**

Steps to Establish Chemically Balanced Water With Onzen Continued

Step 4. Add Salt to Spa Water & Test TA / pH

(a) Slowly pour the dissolved salt from the pail into the spa water.
(b) Run pumps for 5 minutes to help mix salt blend through.
(c) Wait 1 hour.
(d) Then test and adjust Total Alkalinity level accordingly.
(e) Then test and adjust pH level accordingly.

Refer to steps 3 and 4 for correct TA/pH levels.

Step 5. Repeat Step 3 & 4

Repeat steps 5 and 6, ensuring all sub steps are carried out accordingly.

Step 6. Repeat Step 3 & 4

Repeat steps 5 and 6, ensuring all sub steps are carried out accordingly.

Step 7. Test Sodium Chloride Level

You will now need to test sodium chloride levels.

Refer 'Using Sodium Chloride Test Strips' for details.

If sodium chloride levels are low, dissolve 1/2 lb (225 Grams) of salt (using cup provided) into hot water. Pour the dissolved salt into the spa water. Test sodium chloride level.

Repeat until required sodium chloride level is reached:

Minimum	Maximum
1500 ppm	1800 ppm

Note: The Arctic Spas Onzen Salt Chart in this guide provides the estimated impact of adding ½ lb (225 Grams) of salt to your spa.

Note: For start up it is recommended to strive for the minimum salt dosage. Once a Sodium Chloride reading has been taken and the minimum salt dosage achieved, it can be increased slightly to accommodate spa usage and bather load, if increasing the Onzen run time does not adequately increase the Chlorine Residual. Having the minimum amount of salt concentration unless the Onzen system is unable to maintain the proper Chlorine Residual, will reduce potential corrosion and increase the life of the Onzen Output Electrode.

1.12.4 Arctic Spas Onzen Salt Dose Guidance Table

The following table identifies the salt quantity required for each Arctic spa model and estimated impact of adding half pound (225g) of salt.
For start up it is recommended to strive for the minimum salt dosage. Once a Sodium Chloride reading has been taken and the minimum salt dosage achieved, it can be increased slightly to accommodate spa usage and bather load, **if increasing the Onzen run time does not adequately increase the Chlorine Residual. Having the minimum amount of salt concentration unless the Onzen system is unable to maintain the proper Chlorine residual,** will reduce potential corrosion and increase the life of the Onzen Output Electrode.

Arctic Spas - Onzen Salt Dosage Chart								
	Water Volume Metered Fill Point (Bottom of Head Rest)		Required Salt Dosage Onzen Version 8 Min 1500ppm Max 1800ppm				Estimated Impact of Adding Extra Salt	
Spa Model	**Litres**	**US Gal**	**Min Kg**	**Max Kg**	**Min Lb**	**Max Lb**	**225 Grams**	**1/2 lb**
Fox	875	231	1.06	1.32	2.34	2.92	255 ppm	255 ppm
Glacier	1131	299	1.37	1.71	3.02	3.78	195 ppm	195 ppm
Cub	1176	311	1.43	1.78	3.14	3.93	190 ppm	190 ppm
Klondiker	1264	334	1.53	1.91	3.38	4.23	175 ppm	175 ppm
Frontier	1267	335	1.53	1.92	3.39	4.24	175 ppm	175 ppm
Summit	1339	354	1.63	2.03	3.59	4.48	165 ppm	165 ppm
Yukon	1364	360	1.66	2.07	3.65	4.56	163 ppm	163 ppm
Kodiak	1492	394	1.81	2.26	3.99	4.99	150 ppm	150 ppm
Tundra	1614	426	1.96	2.45	4.32	5.40	138 ppm	138 ppm
Norwegian	1553	410	1.89	2.36	4.16	5.20	144 ppm	144 ppm
Ocean	6000	1585	7.28	9.10	16.00	20.08	37ppm	37ppm

Note: The Onzen Technical Guide provides supportive procedures for Onzen set up and Onzen settings.

1.12.5 Using Sodium Chloride Test Strips

The following steps provide guidance to help ensure sodium chloride test strips are used correctly.

Steps to Help Ensure Sodium Chloride Test Strips are Used Correctly	
	Step 1. Take Water Sample Take a sample of water from the spa in a small cup (about 25mm / 1" full). **NOTE: Always take water samples 25-30cm (12"-18") below the water surface.**
	Step 2. Place Test Strip in Water Sample Place the lower end of the strip into the water. IMPORTANT Keep top half of strip COMPLETELY dry to get an accurate reading.
	Step 3. Test Duration Period Leave strip in water for 3 – 5 minutes until yellow band at top of strip turns dark.
	Step 4. Obtain Readings Obtain your reading: where top of white peak falls on the number scale. Read top of peak to the nearest 0.2 division.
	Step 5. Correspond Test Result Reading Correspond the test result reading number with the numbers on the bottle.

Steps to Help Ensure Sodium Chloride Test Strips are Used Correctly Continued

Step 6. Sodium Chloride Adjustment

The following levels are ideal:

Minimum	Maximum
1500 ppm	1800 ppm

Note: The Arctic Spas Onzen Salt Chart in this guide provides the estimated impact of adding ½ lb (225 Grams) of salt to your spa.

Add or dilute water as needed.

- If Sodium Chloride reading is greater than the maximum level, add water.
- If Sodium Chloride reading is less than the minimum level, add salt.

Note: Once Sodium Chloride reading is in the ideal range salt concentration will only change if water is splashed or drained out and spa is replenished with water. Do not add salt unless this test confirms the level is below the ideal range.

Warranty: Use of salt other than Arctic Pure sea salt blend will damage the components and void the warranty. The Arctic Pure blend has been developed to protect Onzen components from damage and the use of alternative salt blends will be easily detected by technicians.

Steps to Stabilize Water

Step 1. Stabilize Spa Water

Once Filtration cycles and filtration duration low level settings have been programmed place the insulated cover on the spa and allow the water temperature to stabilize (approximately 16 hours). Make sure you secure the cover in place using the cover locks. Periodically check the spa water temperature. When the water temperature climbs above 85°F, (29°C) proceed to the next step.

Note: As heat impacts both Calcium and Total Alkalinity a little it is best to heat the water above 29°C (85°F) before advancing to Establishing Correct Water Chemistry.

Filter Cycle Suspension

During a Filter cycle, if an accessory (a pump, the blower, or the light) is used manually, the Filter cycle is suspended during the time that the accessories are used.

Once all accessories are turned off (whether manually or by built-in timer), the Filtration cycle remains suspended for an extra 40 minutes. When a Filtration cycle is suspended the Filtration cycle icon will blink.

1.12.6 Program Filtration & Onzen Settings

The Onzen Chlorine Production (Onzen Cycle Duration) settings need to be programmed:
The following steps provide guidance on how to program the Onzen system settings:

Steps to help Set Filtration & Onzen Settings	
	Step 1. Enter Filtration Options Through Topside Controller Press the Filter button (pump 5 on epics) 5 to enter into your filtration options. Your display will show "SETT" and from here you will be able to choose your settings.
	Step 2. Ozone Cycle Duration Through Topside Controller Press your Filter/Pump 5 button 5 again to display your first option. This is your Ozone Cycle Duration. * Peak II only, if Peak 1 is installed ozone will run during filtration.
	Step 3. Setting Ozone Duration Through Topside Controller Use your arrow keys to select your Ozone Cycle Duration. You can select from 1 to 24 hours per day.
	Step 4. Enter Onzen Settings Through Topside Controller Press your Filter/Pump 5 button 5 again until you see 0n02. Your display will now show the settings for your Onzen system.

Steps to help Set Filtration & Onzen Settings Continued

Step 5. Onzen Cycle Duration

Use your arrow keys ⌄ ⌃ to select your Onzen Cycle Duration.

You can select from 1 to 24 hours per day.

* Cycles are divided into 4 ie: If 8 hours is selected, the system will perform 4 x 2 hour cycles per day.

Step 6. Filter Duration

Press your Filter/Pump 5 button 5 again.

Your display will now show the settings for your Filter Duration.

Step 7. Setting Filter Duration

Use your arrow keys ⌄ ⌃ to select your Filter Duration in hours.

You can select from 0 to 6 hours, the number of hours your filtration will run each time.

Step 8. Filter Cycle Frequency

Press your Filter/Pump 5 button 5 again.

Your display will now show the settings for your Filter Cycle Frequency.

Step 9. Setting Filter Cycle Frequency

Use your arrow keys ⌄ ⌃ to select your Filter Cycle Frequency

You can select from 1 to 4 times per day.

Steps to help Set Filtration & Onzen Settings Continued

You can move backwards through the settings by pressing the Pump 3 button (Pump 4 on Epic series spas). The Pump 1 button will allow you to exit without saving any changes. When you get to the end of the options, press the filter key one last time to save changes and begin a filter cycle immediately. If you do not press the filter key again your changes will be saved and the filter cycle will begin when you have programmed it to do so.

* Press your Filter/Pump 5 button

again to start the next cycles immediately (Pumps will purge for 20 seconds).

To EXIT without saving changes press Pump 1.
To SAVE & EXIT but not start the cycle simply let the display time out.

Is Sanitizer Being Produced and Delivered to Spa Water?

This test requires:
· The water temperature to be at least 80º F (27º C).
· The Filter Cycle Duration to be set to 00.
· Onzen Cycle Duration programmed to On 24. Onzen system will run for 24 hours per day.

Step 1. Set Filtration Cycle Time to Fd 00 (= No Filtration)

Press the Filter Cycle 5 Key until SETT is displayed. The Filter Cycle Duration details "Fd" will be displayed "Fd XX" .

Use down arrow key to change the Filter Cycle Duration to Fd 00.

This de-activates the filtration pump so you can see the mist of gas bubbles produced by the Onzen System.

Step 2. Scroll to On (Onzen Duration) Setting

Scroll through the settings by pressing the Filter Cycle 5 key until it reads "On X ". ("x" will be a value between 0 & 24).

Step 3. Change On Setting to On 24

Change On setting to On 24.

On 24 programs the Onzen system to produce sanitizer 24 hours daily.

Step 4. Scroll Through Settings

Continue scrolling through the settings by repeatedly pushing the Filter Cycle 5 key until the pack resets.

Is Sanitizer Being Produced and Delivered to Spa Water Continued

Step 5. Software Revision

The software revision will flash for 5 seconds.
If any keys are pushed at this stage, you will need to re-start the test from step 1.

* The pack will go through a purge cycle, turning on all pumps for 20 seconds. Wait until this is complete and the water is still.

Step 6. Confirm Onzen Output Electrode is Releasing a Fine Mist of SMALL Bubbles

Before touching any spa control keys, locate the Onzen Output Electrode in the foot well of the spa. There should be a fine mist of small bubbles coming from the fitting within a minute or two.

If no bubbles are visible, dealer service may be required.

Note: You can still sanitize your spa with granular chlorine!

Step 7. Allow to Produce Sanitizer

If you see bubbles, sanitizer is being produced.
Leave the Onzen system to produce sanitizer for the next few hours and make sure it does not shut off.

If you do not see these "fine misty small bubbles' call for service.

Step 8. Reset Filtration Settings

a. After a visual check, you can reset your Filter Cycle Duration.
Fd 1 is suggested.

b. Then reset your desired temperature.

1.12.8 Sanitizer Readings

The following provides guidance on the establishment and maintenance of sanitizer readings.

Sanitizer Readings

You should have sanitizer (Chlorine) readings within 24 hours.

On Start-up, you can add one capful of Arctic Pure "Boost" to the spa water.
Adding a capful of Arctic Pure Boost (Stabilized Chlorine) will establish an instant Free Chlorine level while the Onzen system is producing the residual. This will allow you to safely use the spa until an adequate residual is established.

If levels get too high, turn Sanitizer Production (Chlorine Production "**CP**") setting down. If you are not getting any readings, turn Sanitizer Production (Chlorine Production "**CP**") up.

The closer you monitor spa usage, bather load, monitor FCL and adjust Onzen Sanitizer Production Levels accordingly the less sanitizer you will need to add to your spa water.

Use Arctic Pure, Boost to sanitize the water after heavy usage, or if the Chlorine level is too low.

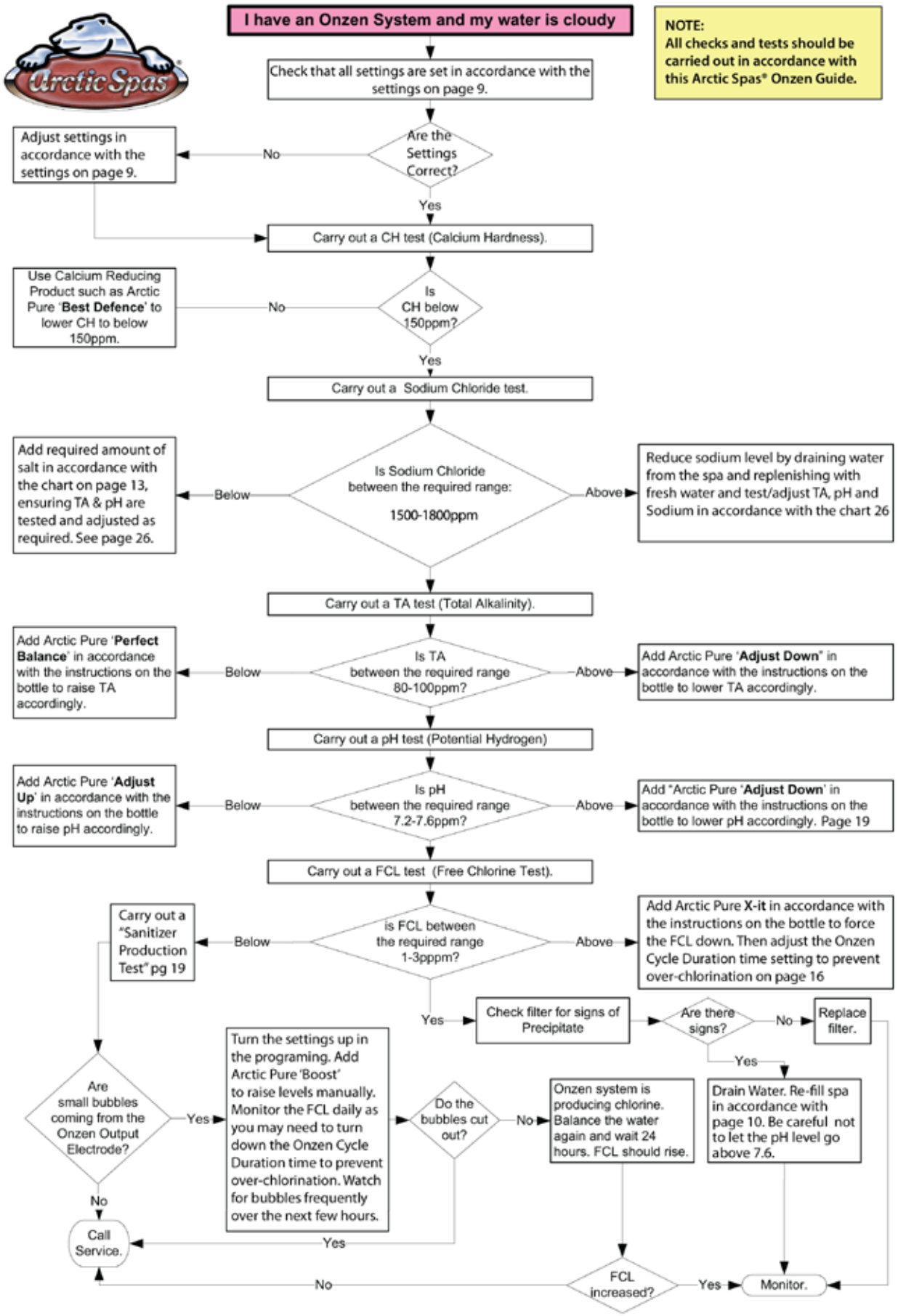
Important: Always test and balance the pH and Chlorine levels before each spa use.
* Expect the pH to increase slowly over each week and when it gets too high use Arctic Pure, Adjust Down to correct it.

High Ph will cause premature failure of the system, cloudy water, and decreased effectiveness of the sanitizer.

The Onzen system works best with low levels of calcium. Check your calcium hardness levels monthly to ensure long life of the spa equipment and maximum user enjoyment.

You must use an oxidizer treatment Arctic Pure, Refresh in your spa. once a week and after heavy bather loads, add one cap of Arctic Pure, Refresh to your spa, leave the cover open for a minimum of 20 minutes to allow the oxidizer gas to vent. A high concentration of trapped oxidizer gas, which may exist as a result of the shock treatment, may eventually cause discolouration or vinyl degeneration to the bottom of the cover. this type of damage is considered chemical abuse and not covered under warranty.

1.13 Onzen Cloudy Water Troubleshooting Flowchart


I have an Onzen System and my water is cloudy
NOTE:
All checks and tests should be carried out in accordance with this Arctic Spas® Onzen Guide.
Check that all settings are set in accordance with the settings on page 9.
Are the Settings Correct?
No
Adjust settings in accordance with the settings on page 9.
Yes
Carry out a CH test (Calcium Hardness).
Is CH below 150ppm?
No
Use Calcium Reducing Product such as Arctic Pure 'Best Defence' to lower CH to below 150ppm.
Yes
Carry out a Sodium Chloride test.
Is Sodium Chloride between the required range:
1500-1800ppm
Below
Add required amount of salt in accordance with the chart on page 13, ensuring TA & pH are tested and adjusted as required. See page 26.
Above
Reduce sodium level by draining water from the spa and replenishing with fresh water and test/adjust TA, pH and Sodium in accordance with the chart 26
Carry out a TA test (Total Alkalinity).
Is TA between the required range 80-100ppm?
Below
Add Arctic Pure 'Perfect Balance' in accordance with the instructions on the bottle to raise TA accordingly.
Above
Add Arctic Pure 'Adjust Down" in accordance with the instructions on the bottle to lower TA accordingly.
Carry out a pH test (Potential Hydrogen)
Is pH between the required range 7.2-7.6ppm?
Below
Add Arctic Pure 'Adjust Up' in accordance with the instructions on the bottle to raise pH accordingly.
Above
Add "Arctic Pure 'Adjust Down' in accordance with the instructions on the bottle to lower pH accordingly. Page 19
Carry out a FCL test (Free Chlorine Test).
is FCL between the required range 1-3pppm?
Below
Carry out a "Sanitizer Production Test" pg 19
Above
Add Arctic Pure X-it in accordance with the instructions on the bottle to force the FCL down. Then adjust the Onzen Cycle Duration time setting to prevent over-chlorination on page 16
Yes
Check filter for signs of Precipitate
Are there signs?
No
Replace filter.
Yes
Drain Water. Re-fill spa in accordance with page 10. Be careful not to let the pH level go above 7.6.
Are small bubbles coming from the Onzen Output Electrode?
Yes
Turn the settings up in the programing. Add Arctic Pure 'Boost' to raise levels manually. Monitor the FCL daily as you may need to turn down the Onzen Cycle Duration time to prevent over-chlorination. Watch for bubbles frequently over the next few hours.
Do the bubbles cut out?
No
Onzen system is producing chlorine. Balance the water again and wait 24 hours. FCL should rise.
No
Call Service.
Yes
FCL increased?
No
Yes
Monitor.

1.14 Onzen Frequently Asked Questions

Onzen Questions
Question 1: How do I know if the Onzen system is working?
Conduct a "Sanitizer Production test" (Also known as a Smoke test). This procedure activates the Onzen System while de-activating the filtration pump so you can see the mist of gas bubbles produced by the Onzen System.
Question 2: What should I do if it fails the "Sanitizer Production test"?
First, confirm you have the correct concentration of salt in the water "using sodium chloride test strips". Then, start maintaining your water manually using "Boost" granular chlorine to sanitize and Adjust Up/Adjust Down to balance pH. Continue to do this daily until the system is repaired by an authorized service technician. * Keep enjoying your hot tub!
Question 3: What should I do if the chlorine levels are too high?
Turn the Onzen Output down (decrease "On" settings). Unless you added granular chlorine or shock to the water high chlorine levels mean the system is staying on too long for your circumstances. It may take a day or two for levels to normalize, or you can speed this process up by using a chlorine neutralizer, such as "X-it".
Question 4: What should I do if the pH keeps increasing?
Confirm that your Total Alkalinity is at the recommended level and reduce it manually with 'Adjust Down'. This is normal; all spa salt systems cause pH to increase.
Question 5: Will the salted water damage my lawn?
This is very unlikely. The recommended concentration of salt is used is approximately 10% of the concentration of sea water.
Question 6: Why is my water bright yellow, or bright green, or a rusty colour suddenly?
This can happen if the pH gets too high. Lower the pH using 'Adjust Down'. High pH is a sign that the Onzen Output may be turned up too high, so you may need to adjust the Onzen Output After balancing the pH and adjusting the Onzen Output wait about 48 hours. If the colour of the water does not normalize you may need to replace the water. * Keep an eye on the pH and adjust it weekly to avoid this problem in the future.
Question 7: What is the typical amount of maintenance I need to do with Onzen?
1. Change the water twice a year. 2. Change the filter 4 times a year. 3. Check the Total Alkalinity weekly to make sure it is in the target range (Under 100). 4. Adjust the pH once a week. Salt systems naturally drive pH levels to increase, strive to achieve a Low pH level 7.2 must not exceed 7.6. 5. Check Calcium level monthly to ensure it is in the target range. Salt systems perform best with Low Calcium levels; strive for a target range between 50 - 150 ppm. 6. Adjust the Onzen Output "On" if hot tub use changes significantly. 7. Adjust the chlorine levels using "Boost" granular chlorine, after heavy use or if the Onzen Output is too low. Refer: Onzen Maintenance Schedule for further details.

Onzen Questions Continued

Question 8: What should I do if the spa is not going to be in use or when I go on vacation?

(please see FAQ #3)
Question 11 Should I use Best Defence or another scale remover?
It is recommended that calcium be removed from the water in advance rather than adding a scale remover after the fact.

Question 9: What is the impact of phosphates on the Onzen system?

High levels of phosphates (above 250 ppb) may reduce the effectiveness of sanitizer output.
Question 13 What happens if my water becomes cloudy?
1. Test the water for chlorine content. If the level is low add Boost.
2. Check your filters as they may require replacement.
3. Check you pH level you may need to adjust you pH down.

Question 10 : Can I use softened water with my Onzen system?

Yes.
You probably have a water softener because your water is quite hard. Your water-softener removes calcium from your water and helps you achieve water with calcium content near the target range, between 50 - 150 ppm.

Question 11: Prior to draining spa water for refill purposes should any form of system flush be carried out?

Yes you can, Arctic Pure 'Fresh Start'. Use in accordance with the instructions on the container. Flushing the system components and hoses is helpful when you get biofilm and calcium build-up.
It is good practice to do this at least once a year.

1.15 Arctic Spas Onzen Maintenance Schedule

The following table outlines the typical water maintenance program required for an Arctic Spa fitted with Onzen.
To help ensure chemicals dissolve appropriately it is good practice to first mix/dissolve the chemical in an uncontaminated container of hot water before carefully adding to the spa water.

Item	Frequency	Maintenance Task	Target Range	Maintenance Action to Adjust/Correct
TA	Weekly	Check the Total Alkalinity to ensure it is in the target range.	**80 – 100 ppm**	**Low TA** - Can be raised by adding **Arctic Pure, Perfect Balance** to spa water. **High TA** - Can be lowered by adding **Arctic Pure, Adjust Down** to spa water.
pH	Weekly	Check the Potential Hydrogen to ensure it is in the target range.	**7.2 – 7.6 ppm**	Salt systems naturally drive pH levels to increase, strive to achieve a Low pH level 7.2. pH must not exceed 7.6. **Low pH** - Can be raised by adding **Arctic Pure, Adjust Up** to the spa water. **High pH** - Can be lowered by adding **Arctic Pure, Adjust Down** to spa water.
FCL	Weekly (& before each use)	Check the Free Chlorine Level to ensure it is in the target range. Adjust the chlorine levels using "Boost" granular chlorine, after heavy use or if the Onzen Output is too low.	**1 – 3 ppm**	**Low FCL** - Can be raised by adding Arctic Pure, Boost and or turning Onzen Cycle Duration (Chlorine Production **On**) Level up. **High FCL** - Can be lowered by: • Natural cause over a few days. • Turning Onzen Cycle Duration (Chlorine Production **On**) down. • Adding **Arctic Pure, X-it**. The above is dependent on FCL level, spa usage and bather load.
ORP	Refer FCL	Refer FCL Maintenance Task	**600–1000 mV**	Refer FCL Maintenance Action to Adjust/Correct.
CH	Monthly	Check Calcium Hardness level to ensure it is in the target range. Salt systems perform best with Low Calcium Hardness levels.	**50-150 ppm**	**High CH** - lower with a stain & scale controller such as **Arctic Pure, Best Defence**, to help hold Calcium in suspension.
Sodium Chloride	Monthly	Check the Sodium Chloride Level to ensure it is in the target range.	**Version 8 1500-1800 ppm**	Once Sodium Chloride reading is in the ideal range salt concentration will only change if water is splashed or drained out. Do not add salt unless this test confirms the level is below the chemical target range. **High Sodium Chloride** - add water. **Low Sodium Chloride** - add salt.
Onzen Output	As required	If spa use changes significantly, adjust the output level of Onzen Chlorine Production ("On")	**2 - 4 Hours per day suggested**	Go into low level settings and adjust Onzen Cycle Duration (Chlorine Production On) accordingly. Adjust to suit spa usage and bather load.
Filter	Every 3 Months	Change the filter	N/A	Change the filter in accordance with Owners Manual instructions
Water	Every 6 Months	Change the water	N/A	Change the water in accordance with Owners Manual instructions.
Note: It is also good practice to take a water sample on a regular basis and have the water independently tested by your local spa/pool store.				

*** Important Notice Onzen V8 ***

These cells are considered a consumable item and are now designed to be replaced by the customer in order to be more user friendly.
We can not express enough to NOT GET THE INTERNAL CONNECTION WET!
To change your salt cell remove the set screw on your salt cell with a Phillips screwdriver. Now unthread the salt cell from the housing turning counter clockwise. This will require you to use your muscles as the cell is threaded in quite tight to prevent any water from getting on to the 12 volt connection. Before threading in the new cell put a generous amount of dielectric grease in and around the 12 volt connections in the centre of the housing and on the end of the cell. Now thread the new cell into the housing. There is a notch built into the threads that will stop the cell precisely where the set screw needs to be installed. If the cell is changed under water the connection will get wet and corrode. The corrosion will destroy the connection between the salt cell and the salt cell housing. This corrosion will be visibly noticeable upon inspection. Warranty will be void If corrosion between the salt cell and salt cell housing is detected.
** This salt cell requires less salt in your water ** you will now need to keep your salt levels between 1200 and 1500 ppm.

Other chemistry requirements:
Calcium hardness maximum of 50 ppm (0 preferred)
Alkalinity 80 and 120 ppm
pH 7.0 and 7.6
You can then check your sanitizer level and adjust your CP level accordingly.
Boost will always be required to sustain sanitize levels from time to time.

Arctic Spas®

Onzen Technical Support Line: 1-780-789-2646
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